DOCUMENT RESUME

ED 460 846 SE 062 679

AUTHOR	Taragan, Barbara
TITLE	[Enter the World of the Naturalist.] Nature. Teacher's Guide.
INSTITUTION	Thirteen WNET, New York, NY.; Public Broadcasting Service, Washington, DC. PBS Elementary/Secondary Service.
SPONS AGENCY	American Gas Association, Arlington, VA. Educational Services.
PUB DATE	1989-00-00
NOTE	16p.; Support also provided by Canon U.S.A., Inc. Videotape and poster not available from ERIC. For other guides in this series, see SE 062 674-81.
AVAILABLE FROM	Thirteen-WNET, 356 58th Street, New York, NY 10019. Tel: 800-336-1917 (Toll Free); Web site: http://www.pbs.org; Web site: http://www.wnet.org.
PUB TYPE	Guides - Classroom - Teacher (052)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Animal Behavior; Animals; Development; Ecological Factors; *Ecology; Elementary Secondary Education; *Environmental Education; Foreign Countries; *Naturalistic Observation; *Physical Environment; Science Activities; Science and Society; Scientific Concepts; Teaching Guides; Water Resources; *Wildlife
IDENTIFIERS	*Animal Communication; Nature; Nature (Television Series)

ABSTRACT

This curriculum guide was developed for use with public television's Nature series. The materials in the guide are designed to help students actively participate in the study and experience of nature. Students are encouraged to view the programs as naturalists would, observing animals in their environment, noting their behavior, and drawing conclusions. Each lesson in the Teacher's Resource Guide includes: (1) a "Program Overview" that presents background information and brief synopses of the program to be viewed; (2) "Objectives" that provide the teacher with measurement goals; (3) a "Before Viewing Activity" that familiarizes students with the subject and allows them to set purposes for viewing; (4) "Vocabulary" that features definitions of unfamiliar words used in each program; (5) "Discussion Questions" that help students assess the main points of the program; (6) "Suggested Reading" for students who may want to learn more about the topic; and (7) a "Naturalist's Guide" (student worksheet) to be duplicated and distributed to students. The programs highlighted in this guide focus on animal family groupings, exploring the various ways they bear and raise young and share tasks and responsibilities such as hunting and protection. Program titles include "Kali the Lion," "Year of the Jackal," "The Frozen Ocean," "The Land of Beyond," and "The Young Ones." (WRM)

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TEACHER'S GUIDE

ED 460 846

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NATURE is made possible by the Corporation for Public Broadcasting, by the nation's Public Television Stations, and by underwriting grants from the American Gas Association (A.G.A.) and Canon U.S.A., Inc.

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ENTER THE WORLD OF THE NATURALIST

ACKNOWLEDGEMENTS

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TO THE TEACHER

INTRODUCTION

This curriculum guide has been developed for use with Public Television's NATURE series. Hosted by George Page, NATURE illuminates the beauty and mystery of the natural world as it explores a wide range of topics. The programs highlighted in this guide focus on animal family groupings, exploring the various ways they bear and raise young and share tasks and responsibilities, such as hunting and protection. Kali, a lioness that lives on the Maasai Mara grasslands of Kenya, is the focus of "Kali the Lion." A family of golden jackals is the subject of "Year of the Jackal," a wonderful story of life and survival on the Lemuta grasslands of Tanzania. "The Frozen Ocean," from the NATURE mini-series KINGDOM OF THE ICE BEAR, looks at marine mammals of the Arctic, including polar bears, walruses, and seals as well as at a variety of sea birds. "The Land of Beyond," from the same series, examines land mammals of the Arctic, including caribou, lemmings, foxes, and hares. The program explores how they breed and raise their young during the abbreviated Arctic summer. "The Young Ones," from the NATURE mini-series THE NATURE OF SEX, highlights the ways various species breed and care for their young.

The materials in this guide have been designed to help students actively participate in the study and experience of nature. Students are encouraged to view the programs as naturalists would, observing animals in their environment, noting their behavior, and drawing conclusions.

Each lesson in the Teacher's Resource Guide includes:

- a *Program Overview* that gives background information and brief synopses of the program to be viewed;
- *Objectives* that provide the teacher with measurable goals;
- a *Before Viewing Activity* that familiarizes students with the subject and allows them to set purposes for viewing;
- *Vocabulary* that gives definitions of unfamiliar words used in each program;
- *Discussion Questions* that help students assess the main points of the program;
- a *Suggested Reading* for students who may want to learn more about the topic;
- a *Naturalist's Guide* (student worksheet) to be duplicated and distributed to students. This student worksheet contains activities that encourage students to view the programs as a naturalist would in order to gain a better understanding of animals, their habits and habitats, and other factors that affect their existence. The guides encourage family viewing and contain cooperative learning activities.

Creating A Naturalist's Diary

Naturalists often keep diaries to record their observations. In order to complete activities presented in this guide, students will need to make diaries of their own. Students may set aside part of their science notebook or may choose to make and use a separate booklet for this purpose. Diaries may include news clippings, drawings, photos, maps, charts, graphs, and other information as well as records of observations. Students may wish to share their diaries with others or use their entries to develop a bulletin board display that reflects what they have learned as naturalists.

Program Scheduling

Programs are scheduled to be broadcast on the dates indicated below. Broadcast dates, however may vary slightly from area to area. Please check local listing for any scheduling changes.

PROGRAM	BROADCAST DATE
"Kali the Lion"	February 23, 1994
"Year of the Jackal"	February 27, 1994
"The Young Ones"	May 1, 1994
"The Frozen Ocean"	May 4, 1994
"The Land of Beyond"	May 4, 1994

Video Taping Rights

You may assign programs to your students for viewing when they are first broadcast, or you have the right to tape the programs off the air and to play them for instructional purposes within ten days of the original broadcast.

OBJECTIVES

Students will

- examine the roles of individual lions within a pride;
- observe and analyze how lions cooperate to obtain food, protect themselves, and raise their young.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

dominant *adjective:* ruling, controlling, or most powerful.

marsh *noun:* open, treeless wetland characterized by the growth of grasses.

nomadic *adjective:* moving from place to place.

plains *noun:* grassland that contains scattered trees and is, in some areas, home to herds of grazing animals and the predators that hunt them.

predator *noun:* an animal that hunts other animals for food.

prey *noun:* an animal that is hunted by another animal.

pride *noun:* the social unit of lions, the basis of which is a group of related females and their young.

SUGGESTED READING

For students who may want to learn more about this topic you may suggest the following:

Schaller, George. *The Serengeti Lion.* Chicago: University of Chicago Press, 1972.

KALI THE LION

BROADCAST: WEDNESDAY, FEBRUARY 23, 1994

PROGRAM OVERVIEW

Each year a season of drought turns Kenya's Masai Mara grasslands into desertlike barreness. Migrating herds flee its scarcity; wildlife that remains barely keep alive. Even the great hunters — the lions — face starvation. But each year the drenching rains return to end the hardship. Grasses proliferate once more and herds are drawn back by its richness; herds that in turn will provide a feast for the plains predators. A season of plenty renews the savannah.

"Kali the Lion" follows the compelling story of one female lion through one dry and one rainy cycle. The desperation of life during the dry season is captured in powerful images of Kali's undernourished, famished cubs and her heroic attempts to bring down a water buffalo to feed them. The abundance of life during the rainy season is revealed in scenes of Kali, pregnant with a cub, still able to successfully hunt game.

But more than documenting the seasonal cycles of the African grasslands, "Kali the Lion" chronicles the remarkable strong and affectionate bonds that tie lions to their pride. Many poignant and tense moments are captured in scenes of Kali and members of her pride hunting, feasting, and caring for young. These include: Kali calling for a lost cub, the victory over a water buffalo, the ailing leader Kichwa waiting for stronger pride members to feed before taking his share, and Bundu, the oldest female, providing for the pride's cubs. The power of these bonds become even more striking when compared to the dangerous existence Kali faces when she leaves the pride and must fend for herself and her cub.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Call on a volunteer to locate Kenya and the Masai Mara Game Reserve on a world map. Mention that the Masai Mara is a grassland that supports huge herds of grazing animals and thus the predators that prey upon them. Explain that the program they will see follows one grassland predator — the lion. Have students identify the animals that share the grasslands with lions. Then develop food chains and a food web that illustrates how these animals depend on one another and on the plants in their environment. Tell students that the program they will see, "Kali the Lion," chronicles a lioness's life during a lean dry season, and a plentiful rainy season.

Distribute the Naturalist's Guide

Duplicate and distribute the Naturalist's Guide to students and preview it with them. As they watch the program, ask students to observe how lions live cooperatively in a pride and to identify the roles played by males and females. Encourage them to take notes and make sketches of the lions as they view the program.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. Identify and describe the roles of the Marsh pride members. (The dominant male, Kichwa, protects cubs and females from outside males. The related females hunt and care for the pride's twelve cubs.)
2. Why are lions more effective when they hunt as a group? (Unable to outrun most prey, they must rely on confusing and surprising them. As a group they can bring down animals weighing more than 500 lbs.)
3. What determines who gets the "lion-sized" share of the kill? How does this behavior benefit the pride? (After a kill, lions compete with one another to feed. The strong feed first and best. In lean times cubs and weak members may starve, but the strong continue to breed and provide for the very young.)
4. Why did Kali leave the Marsh pride? Why could she not return? (Kichwa had died and Kali was ready to mate. A new male leader would kill her cubs.)
5. Why are images of lions used in advertising? What qualities are associated with lions? How do these images compare to the real animals? (Responses will vary.)

PROGRAM DATE:_____ TIME:_____ CHANNEL:_____

KALI THE LION

A naturalist observes the way members of a family group communicate.

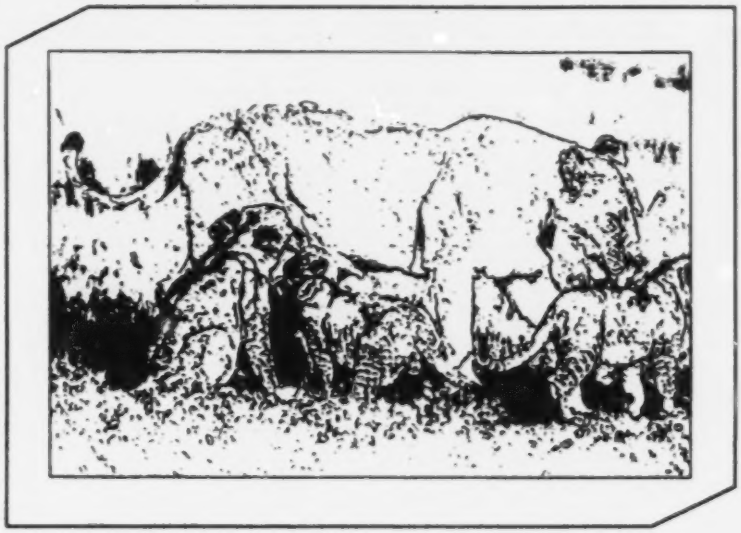
Complete the first activity and one other activity of your choice.

TO THE FAMILY

You are invited to view NATURE. As you watch the program, note the roles individual lions play in a pride and draw conclusions about how this behavior helps the pride survive. After the program discuss your observations with your family.

KALI'S GOOD FORTUNE

As you view the program, compare Kali's life as a member of a pride with her life as a lone lion. In particular, note how she protects herself and obtains food in both situations. With a group of classmates discuss how living in a pride benefits Kali, the pride, and the lion species. Present your conclusions to the class.



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Lions live in groups called prides. Pride members share many tasks such as hunting, caring for young, and protecting the pride.

LION LANGUAGE

In order for lions to live in cooperative groups they must communicate with one another. With a partner or a small group, discuss how lions used sounds, scents, facial expressions, and body movements to communicate. Organize your information in a chart like the one shown. You may wish to do some library research to help fill in any information not included in the program. Use drawings to help illustrate your findings.

COMMUNICATION AMONG LIONS

BEHAVIOR	MEANING
baring teeth / snarl	ready to attack
low growl / moan	calling to cub
meowing (cub)	
roaring	
crouching; move forward quickly	
(other)	

COMPARING CATS

Household cats are also members of the cat family. How is their behavior similar to lion behavior? How is it different? Spend time observing a household cat, and note its behavior. Compare its anatomy, adaptations and behavior to that of a lion. What similarities exist? Present your findings to the class.

KALI: THE SEQUEL

Imagine that you are writing a sequel to "Kali the Lion." With a partner write what will happen to Kali, her cubs, the Marsh pride, and the Bilashaka pride in the year that follows the first documentary. Use what you have learned about lions to help you predict the lives of Kali and the other lions. Present your story to the class.

OBJECTIVES

Students will

- understand how jackals cooperate as a family and share tasks;
- recognize how jackals' hunting techniques change with the seasons;
- observe and analyze jackal behavior.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

carrion *noun:* dead and rotting animal bodies.

regurgitate *verb:* to vomit or bring up undigested food from the stomach.

sibling *noun:* brother or sister.

submissive *adjective:* obedient, willing to give in to another.

wean *verb:* to train a young mammal away from its mother's milk and onto solid foods.

yearling *noun:* a one-year-old animal.

SUGGESTED READING

For students who may want to learn more about this topic you may suggest the following:

van Lawick, Hugo. *Innocent Killers.* Boston: Houghton Mifflin, 1971.

YEAR OF THE JACKAL

BROADCAST: SUNDAY, FEBRUARY 27, 1994

PROGRAM OVERVIEW

The Serengeti Plain covers 5,693 square miles along the border between Tanzania and Kenya. In the rainy season it is home to herds of wildebeest, zebra, and gazelle that migrate there to feed on the abundant grasses. This bounty of prey animals transforms the Serengeti into a competitive arena for predators — lions, cheetahs, leopards, hyenas, wild dogs, and jackals.

With the coming of the dry season the grasses become brown and dry and the herds of grazing animals leave in search of greener pastures and water. Year-round residents of the Serengeti, however, must adapt to these changing resources. One such resident is the golden jackal. Members of the dog family, jackals live in extended families, sharing the tasks of hunting and caring for their young.

Each jackal family is headed by a pair of adults. Mated for life, they cooperate in the various tasks of providing for their active family. While the pair hunts, the young cubs are cared for by an older sibling that will one day leave the family to begin one of its own.

"Year of the Jackal" documents one year in the life of a golden jackal family, predators whose lives depend on skill, cooperation, and the bonds that keep them together.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Using a world map or a globe, have students locate Tanzania in East Africa and find the Serengeti Plains. Explain that the climate of this region results from two distinct periods, the rainy season and the dry season. The rainy season produces abundant grasses and draws thousands of migrating animals — along with their predators. Ask students to name some predators that might be found on the Serengeti. Suggest the jackal, if students do not mention it themselves, and ask them to describe what they know about jackals in general. Tell them that the program they will see, "Year of the Jackal," documents the life of a family of golden jackals on the plains of Lemuta near the Serengeti grasslands.

Distribute the Naturalist's Guide

Duplicate and distribute the Naturalist's Guide to students and preview it with them. As they watch the program, ask students to observe how the jackals cooperate as a family and to note how hunting strategies change with the seasons. Encourage them to take notes and make sketches of the jackals as they view the program.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. How do jackal hunting strategies change with the seasons? (Rainy season: jackal teams hunt mammals; dry season: jackals hunt alone for reptiles and insects.)
2. How did Bold Cub's injury change his relationship with the rest of the family? How was Bold Cub's special relationship with his father demonstrated? (His injury made him a burden to the family. Father seemed to favor Bold Cub. He paid special attention to him after the injury.)
3. At the program's start, which cub had the best chance of survival? Why? (Responses should be supported with facts from the program.)
4. Describe the role teamwork plays in the jackals' hunting strategies. (Together they isolate and overcome prey. One may divert a mother gazelle, for example, while the other attacks the fawn.)
5. Naturalists do not know why adult jackals sit outside during rainstorms. Formulate a hypothesis for why this is so. (Hypotheses should be supported with logical reasoning.)

PROGRAM DATE:_____ TIME:_____ CHANNEL:_____

YEAR OF THE JACKAL

A naturalist analyzes the roles of individuals within a family.

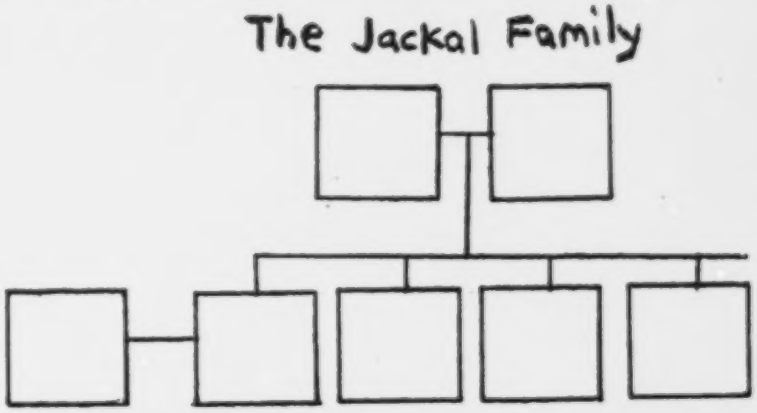
Complete the first activity and one other activity of your choice.

TO THE FAMILY

You are invited to view NATURE. As you watch the program, note the cooperative behavior among the jackals and draw conclusions about how this behavior helps the family to survive. After the program discuss with your family what you have learned about jackals.

FAMILY MEMBERS AND THEIR ROLES

Using a diagram like the one below, make a family tree for the family of jackals. Write in the names of these jackals: Poppin, Bold Cub, Mother, Father, Brother, Sister, Ash. Take notes about the tasks each family member carries out. Note which jobs males and females share and which are exclusively male or female.



DEBATE: SHOULD HUMANS INTERVENE?

With a group organize a debate on the following statement: *The naturalists filming, "Year of the Jackal" should have stepped in to save the life of Bold Cub.* Use information from the program as well as library research to support your position.

THE JACKAL IN LITERATURE

Since the time of the ancient Egyptians, the jackal has been a focus of human interest. Research the role of the jackal in African literature, mythology, and folklore. Choose several stories or myths to share with your class. Create a bulletin board display to highlight your selections. Bring your display to life with illustrations of your own.

SURVEYING ATTITUDES

Examine how our attitudes toward specific animals in our own country affect the way we relate to them, their environments, and their problems. Conduct a survey of ten people. Ask their opinions of the following animals: wolves, killer whales, sharks, bats, snakes, bears, spiders, and vultures. Ask also whether or not they feel that these animals and their habitats should be protected. Compile your findings with those of other students who have chosen this activity. Present your data in a graph.

Jackals live in family groups and cooperate in various tasks. While the adults hunt, young cubs are cared for by an older sibling.

© Leonard Rue, Jr./Animals Animals

OBJECTIVES

Students will

- observe and analyze how different species raise their young;
- identify and describe cooperative groups in which different species live.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

embryo *noun:* an animal in the early stages of its growth, while it is in the egg or the uterus.

gene *noun:* a part of the cell that contains an inherited characteristic.

larva *noun:* in most insects, the immature, flightless stage that transforms into a resting stage called a pupa or another stage before becoming an adult.

mammal *noun:* a backboned animal that has hair, a constant blood temperature, and that feeds milk to its young.

marsupial *noun:* a mammal in which the female lacks a complete placenta and gives birth to immature young which are carried in an abdominal pouch.

primate *noun:* a group of mammals that includes man, apes, monkeys and other related mammals.

spawn *verb:* to shed large quantities of eggs and sperm directly into the water, as done by many fishes and mollusks.

SUGGESTED READING

For students who may want to learn more about this topic you may suggest the following:

Stein, Sara. *The Evolution Book.* New York: Workman Publishing, 1986.

THE YOUNG ONES

BROADCAST: SUNDAY, MAY 1, 1994

PROGRAM OVERVIEW

The reproductive and parenting behaviors found in animal species are as varied as the species themselves.

For some species, such as the elephant, parenting is a long demanding process. An elephant's pregnancy lasts a lengthy twenty-two months and elephant calves require many years of nurturing and protecting. During these years they will be given support and guidance and will be taught the skills they need to survive. As adults they will, in turn, nurture, protect, and teach their own offspring.

Not all animals need such intense care. Greater flamingoes produce young which are cared for by other adults in a kind of "day care" setting. Feeding, protecting, and teaching the young is carried out during one breeding season. Then the young birds are on their own, although they will still be able to find protection within the flock.

At the far end of the parenting spectrum are those animals who breed but who take no role in the raising of their young. Adult squid mate once during a lifetime producing many hundreds of eggs. Their parenting role over, these squid will soon die on the ocean floor. The young squid are left to fend for themselves. Most will fall victim to predators, but some will survive to reach adulthood.

"The Young Ones," from the NATURE miniseries THE NATURE OF SEX, documents the wide and remarkable range of parenting behaviors, examining the ways animals feed, protect, and teach their young the skills necessary for survival.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Have students discuss how pets and domesticated animals care for their young. Expand the discussion by asking students to suggest other animal species including:

- an animal that gives birth to one or two offspring and spends many years caring for them. (elephant, chimpanzee, humans)
- an animal that gives birth to one or two young, and spends a short time (a few months or years) caring for them (most birds, beaver, bear)
- an animal that produces many hundreds or thousands of young, but plays no parenting role. (spiders, turtles, some reptiles)

Allow students time to discuss what they know about the parenting behavior of these species and to draw conclusions about how these behaviors aid in the survival of the species. Explain that the program they will see, "The Young Ones," explores the wide and remarkable range of parenting behaviors.

Distribute the Naturalist's Guide

Duplicate and distribute the Naturalist's Guide to students and preview it with them. As they watch the program, ask students to note the many ways species reproduce and raise young. Encourage them to take notes and to make sketches of the animals that interest them.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. Compare the reproductive and parenting behaviors of chimpanzees, bulldog ants, and squid. (Chimpanzees produce only a few young in a lifetime; young require many years of nurturing. Only the queen bulldog ant lays eggs; other females are infertile and feed larvae. Squid produce thousands of young who must fend for themselves.
2. What different strategies are employed by the squid and the chimpanzee to ensure that their offspring will survive? (The squid does nurture its young, but has many thousands of them so that a few will survive to adulthood. The chimpanzee carefully nurtures, protects and teaches its few young, ensuring that most will reach adulthood.)
3. What are some strategies employed by animal parents to protect their young? (Jacanas and other ground-nesting birds may feign a broken wing to lure predators away from a nest. Greater flamingos care for chicks in nurseries. The ibex lives in a place so inaccessible that predators are unable to reach its young.)

PROGRAM DATE:_____ TIME:_____ CHANNEL:_____

THE YOUNG ONES

A naturalist observes how animals care for, protect, and teach their offspring.

Complete the first activity and one other activity of your choice.

TO THE FAMILY

You are invited to view NATURE. As you watch the program, note the range of parenting behaviors and draw conclusions about how these behaviors help each species to survive. After the program share your observations with your family.

ALL IN THE FAMILY

As you view the program, take notes about the female polar bear and the strategies she uses to care for, feed, protect, and teach her young. Discuss your findings with a group of classmates to fill in any information you missed. With the group compare the polar bear's parenting with that of another species featured in this program or with that of the lioness featured in "Kali the Lion." Describe how the parenting strategies are alike and how they are different. Present your findings to your class.

Animal	Feed	Protect	Teach	Other members of group share in tasks
Chimpanzee				
Squid				
Amaurobius Salter				
Jacanas				
greater Flamingos				
Elephants				

© Sun-O Lindblad/Photo Researchers

For the elephant, parenting is a long, demanding process. Pregnancy lasts a lenghty 22 months and elephant calves require many years of nurturing and protecting.

COMING OF AGE

For humans, coming-of-age ceremonies mark the end of adolescence and the beginning of adulthood. Such ceremonies, such as the Eunuto ceremony of the Masai people, formally acknowledge that a young person has been accepted into adult society and is ready to assume adult responsibilities. With a group, research coming-of-age ceremonies in your society, including confirmations, bar mitzvahs, bas mitzvahs, sweet sixteen celebrations, high school graduations, and others. Make a presentation of your research to your class.

THE YOUNG ONES

With a group create a bulletin board display that illustrates the various family groupings in which animals are raised as well as the variety of parenting strategies utilized. Include a short paragraph describing parenting behaviors for each animal species highlighted.

OBJECTIVES

Students will

- observe and analyze the effect of seasonal changes on marine mammals of the Arctic region;
- identify strategies that animal parents use to breed and to feed, protect, and teach their young.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

algae *noun:* simple marine and freshwater plants including seaweeds ranging from single celled to many celled.

amphipods *noun:* a group of shrimplike animals that includes the sand flea.

carnivore *noun:* an animal that is adapted to feed primarily on animal flesh.

floe *noun:* a piece of floating ice on the surface of a body of water.

pinniped *noun:* a group of marine mammals with limbs modified for swimming. Composed of seals, sea lions, fur seals, and walruses.

plankton *noun:* small, mostly microscopic, freshwater and marine animals and plants that float or drift at or near the surface; includes algae and larvae of mollusks and crustaceans.

polynya *noun:* an open area of water in sea ice.

SUGGESTED READING

For students who may want to learn more about this topic you may suggest the following:

Feazel, Charles T. *White Bear: Encounters with the Master of the Arctic Ice.* New York: Ballantine Books, 1990.

THE FROZEN OCEAN

(The first hour of a three-hour presentation.)

BROADCAST: WEDNESDAY, MAY 4, 1994

PROGRAM OVERVIEW

The bleakness of the Arctic Ocean's ice-covered surface belies the fact that its waters are a rich pasture of plankton being harvested by a host of sea mammals, fish, and shellfish. The harsh winters in this region last a bitter eight months. But with the coming of spring, the return of sunlight, and the breaking up of the thick sea ice, even its seemingly inhospitable surface is alive with wildlife. Long, almost endless days of sunlight help to compensate for the brief four-month summer season. Female polar bears and their cubs abandon their dens in their hunt for prey. Millions of migrating birds vie for good nesting locations on the rocky cliffs that form the shores of islands of the High Arctic or coastal tundra areas. Arctic foxes and glaucous gulls prey on the new arrivals or scavenge meals from other hunters' leftovers. The sea is bountiful, and pinnipeds, dolphins, narwhals, belugas, and other whales feast near the edges of Arctic ice floes.

"The Frozen Ocean," from the NATURE miniseries KINGDOM OF THE ICE BEAR, documents the summer awakening of the Arctic region. Focusing on marine mammals, the program shows how some species breed and raise their young during the short Arctic summer. Highlighted are a female polar bear teaching her new cubs hunting techniques, seals escaping a polar bear, and guillemot fledglings on their half-mile flight to the sea.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Write the word *Arctic* on the chalkboard. Using a globe or world map, have students locate the Arctic and name the countries in this region. Also have students note the Arctic's location in relation to their own location. Help them develop an overall picture of what the Arctic is like by having them discuss what they know about its geography, seasons, climate, plants, and wildlife. Then tell students that the program they will see, "The Frozen Ocean," documents the lives of some marine mammals of this region during one brief Arctic summer.

Distribute the Naturalist's Guide

Duplicate and distribute the Naturalist's Guide to students and preview it with them. As they watch the program, ask students to observe both the cooperative and competitive behavior of the polar bear and other species such as the walrus. Encourage them to take notes and make sketches of the marine mammals as they view the program.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. Female polar bears are the sole caretakers of their cubs. How does their parenting role compare with the parenting roles of other species who raise their young in family groupings? (The polar bear has a greater responsibility because she must do all tasks associated with child rearing. Other species share child-rearing tasks.)
2. What adaptations and behaviors help mammals of the Arctic Ocean region survive? (Insulating fat, protective coloration, fur, streamlining of body, burrowing, dormancy, and migration.)
3. Why do many species of sea birds and some marine mammals migrate to the Arctic each year? (There is an abundant supply of plankton and fish for animals and young to feed on.)
4. How do marine mammals, such as the belugas and narwhals, communicate underwater? (They use a variety of vocal sounds to communicate.)

PROGRAM DATE:_____ TIME:_____ CHANNEL:_____

THE FROZEN OCEAN

A naturalist observes how plants and animals have adapted to their environment.

Complete the first activity and one other activity of your choice.

TO THE FAMILY

You are invited to view NATURE. As you watch the program, make observations about life in the Arctic Ocean region. After the program discuss the various strategies employed by animal parents in breeding, feeding, protecting, and teaching their young.

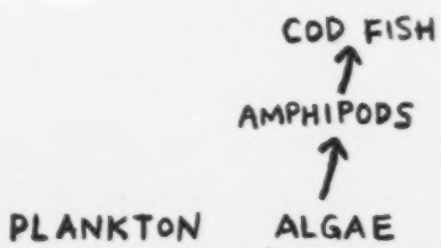
FAMILY MATTERS

As you view the program, takes notes about the female polar bear and the strategies she uses to care for, feed, protect, and teach her young. Discuss your findings with a group of classmates to fill in any information you missed. With the group compare the polar bear's parenting with that of another species featured in this program or with that of the lioness featured in "Kali the Lion." Describe how the parenting strategies are alike and how they are different. Present your findings to your class.

Female polar bears are the sole caretakers of their cubs. Besides providing them with food, females must also protect them, especially from male polar bears, who are a threat.

ENERGY PATHWAYS

Like any other system, an ecosystem needs a power source to keep it going. In nature the sun provides energy. Through photosynthesis plants convert the sun's energy into food energy. A food web is a diagram that shows the plants and animals of an ecosystem according to what each utilizes as food energy. With a partner create a food web for the Arctic Ocean. Include the following: seal, algae, plankton, walrus, cod, polar bear, amphipods, clams. Do library research to fill in any information from the program you have missed. Here is the beginning of a web to get you started.



NARWHALS

In the program the narrator stated that the function of the single tusk of the male Narwhal is still unknown. With a partner formulate a theory explaining why the Narwhal has a tusk and how it functions. Before formulating your theory, do library research to learn more about the Narwhal's environment, enemies, behavior, and other factors that might have led to the evolution of the tusk. Present your theory to your class.

OBJECTIVES

Students will

- explore the parenting behaviors utilized by some animals of the Arctic region;
- examine how wildlife and plants have adapted over time to life in the Arctic;
- explore the seasonal patterns of the Arctic tundra.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

camouflage *noun:* behavior or protective coloration that enables wildlife to hide from predators or that hides predators from the prey animals they are stalking.

display *noun:* a conspicuous behavior used to attract a mate or to intimidate a predator or rival.

dormancy *noun:* a period of suspended activity that is a part of the life cycle of some plants and animals.

lichen *noun:* a plant partnership composed of an alga and a fungus in a symbiotic relationship — they live together advantageously as one unit.

migrate *verb:* an annual movement to and from breeding or feeding grounds.

tundra *noun:* a treeless plain with stunted plantlife and permanently frozen subsoil found in Arctic or sub-Arctic regions or on some moutaintops.

SUGGESTED READING

For students who may want to learn more about this topic, you may suggest the following:

Caras, Roger. *The Endless Migrations.* New York: E.P. Dutton, 1985.

THE LAND OF BEYOND

(The second hour of a three-hour presentation.)

BROADCAST: WEDNESDAY, MAY 4, 1994

PROGRAM OVERVIEW

North beyond the treeline, encircling the top of the world, is a vast frozen land — the Arctic tundra. During its harsh eight-month winters, the tundra is frozen and snow covered. Few creatures remain to roam its barren lands. Pregnant female polar bears enter dens sheltered by the snow, while the males hunt seal on the ice floes of the Arctic Ocean.

Intensity defines the Arctic tundra: hostile and barren Arctic winters, and welcoming and fruitful Arctic summers. With temperatures averaging 35° to 50° F and almost twenty-four hours of daylight comes the melting of the top layer of soil. Abundant low-growing plants flower profusely. Meltwaters, which cannot be absorbed by the frozen subsoil, collect on the surface, forming wetlands. These waters are breeding areas for insects, fish, and crustaceans. Herds of musk ox and caribou and flocks of birds find abundant food, while themselves often being stalked by predators.

"The Land of Beyond," from the NATURE mini-series KINGDOM OF THE ICE BEAR, chronicles the seasonal cycles of one year in the Arctic tundra. The program highlights land mammals such as caribou, musk oxen, wolves, and lemmings and examines how they breed and raise their young during one abbreviated Arctic summer.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Remind students that they have examined the marine mammals of the Arctic region and that now they will learn about the land animals that inhabit the Arctic tundra. Tell students that winters in the Arctic last eight months and the temperatures often drop to - 50° F and sometimes even lower. Ask students to discuss, using what they have learned about animals, how animal adaptations and behaviors might help them survive these harsh conditions. Write their responses on the chalkboard. Tell students that the program they will see, "The Land of Beyond," examines the diverse animal species that make their home on the Arctic tundra as well as the species that migrate there to breed and feed.

Distribute the Naturalist's Guide

Duplicate and distribute the Naturalist's Guide to students and preview it with them. As they watch the program, ask students to observe how animal species breed, feed, protect, and teach their young in this harsh environment. Encourage them to take notes and make sketches of the animals that interest them as they view the program.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. What are some of the characteristics of the Arctic tundra in winter? in summer? (Little daylight during winter months; frozen land covered with ice/snow; little animal activity. Almost constant daylight in summer; temperatures reach 70° F.; low-growing plants bloom; meltwaters form ponds, lakes, and wetlands abundant with aquatic life and insects; high animal activity.)
2. How do year-round animal residents survive the long Arctic winters? (They hibernate; live on body fat or vegetation stored in their nests; scavenge for carrion or prey on the animals that remain during the winter; use body fat, fur, feathers to keep warm.)
3. How does a "lemming year" affect other species? (A large lemming population provides abundant food and allows jaegers, Arctic foxes, and snowy owls to produce more young.)
4. Why do birds and animals migrate to the tundra? (Abundance of plants, crustaceans, insects, fish, and other animals to feed on. Constant daylight allows round-the-clock feedings.)

PROGRAM DATE:_____ TIME:_____ CHANNEL:_____

THE LAND OF BEYOND

A naturalist draws conclusions based on observations.

Complete the first activity and one other activity of your choice.

TO THE FAMILY

You are invited to view NATURE. As you watch the program, note how animals of the Arctic tundra have adapted to the harsh environment. After the program talk with your family about the different family groupings you saw and how each group raises its young.

TOGETHER WE STAND

The animals of the Arctic, both year-round residents and migratory ones, live in a variety of family groupings. Some live in packs, some in herds, some in pairs. As you view the program identify the kind of group each animal lives in. Note how each animal cares for, feeds, protects, and teaches its young. You may want to make a chart like the one below to help organize your information.

ORGANIZATION OF ARCTIC ANIMAL FAMILIES

Animal	Family Grouping	Feeding	Protecting	Teaching
Caribou	herd	mother's milk; then grazing	calf stays with herd near to mother	
Barnacle Geese	pair			
Wolves				
Snowy Owls				
Arctic Fox				

JET SETTING WITH THE FLY GROUP

Many species of birds migrate to the Arctic tundra to breed and raise their young. With a group research the migration routes of the following: Arctic terns, barnacle geese, Lapland longspurs, snow buntings, old squaw ducks, long-tailed jaegers, king eider ducks, black-throated loons, red phalaropes, and ruddy turnstones. Illustrate the migration paths of each species on a world map. Use different colored string or yarn for each species. Include your own sketches of the birds. With your groups talk about how the destruction of habitats along the migration routes would affect the migration patterns of these species. Using the map as a visual aid, present your findings in a report to your class.

AS DARKNESS FALLS

Many people refer to the Arctic tundra region as the "land of the midnight sun," because during summer months there is almost constant sunshine. With a partner create a demonstration that shows why the Arctic region has almost endless summer days and almost endless winter nights. Use library resources, especially earth science books, for information and for tips on how to conduct the experiment. Equipment you might need includes: a flashlight and a globe or beach ball. Conduct a demonstration for the class.

© Hugh Miles

Caribou calves find protection within the herd.

BEST COPY AVAILABLE

VIDEOCASSETTE INFORMATION

"The Frozen Ocean" from the mini-series KINGDOM OF THE ICE BEAR and "Kali The Lion" are available in VHS videocassette for use in your school or library for $24.95 each plus shipping and handling.

To order please call: Time/Life at 1-800-852-2398

"The Young Ones" from the mini-series THE NATURE OF SEX is available in VHS videocassette for use in your school or library for $19.95 plus shipping and handling.

To order please call: Thirteen/WNET at 1-800-336-1917

NATURE SCHEDULE

PROGRAM	BROADCAST DATE
"Kali the Lion"	February 23, 1994
"Leopard: A Darkness in the Grass"	February 23, 1994
"Year of the Jackal"	February 27, 1994
"Echo of the Elephants"	March 6, 1994
"A Sea Otter Story"	March 13, 1994
"The Tree of Music"	March 20, 1994
"The Primal Instinct" (from THE NATURE OF SEX)	March 27, 1994
"A Time and a Place" (from THE NATURE OF SEX)	April 3, 1994
"The Sex Contract" (from THE NATURE OF SEX)	April 10, 1994
"Sex and the Human Animal" (from THE NATURE OF SEX)	April 17, 1994
"A Miracle in the Making" (from THE NATURE OF SEX)	April 24, 1994
"The Young Ones" (from THE NATURE OF SEX)	May 1, 1994
"The Frozen Ocean" (from KINGDOM OF THE ICE BEAR)	May 4, 1994
"The Land Beyond" (from KINGDOM OF THE ICE BEAR)	May 4, 1994
"The Final Challenge" (from KINGDOM OF THE ICE BEAR)	May 4, 1994
"Hebrides: The Secret Islands"	May 8, 1994
"The Toadskin Spell"	May 15, 1994
"From the Heart of the World"	May 22, 1994
"Madagascar: Island of Ghosts"	May 29, 1994
"Slaves to the Queen"	June 5, 1994
"Elephant Seals: Those Magnificent Diving Machines"	June 12, 1994
"A Celebration of Birds with Roger Tory Peterson"	June 19, 1994
"Spirit of the Sound"	June 26, 1994

THIRTEEN/WNET, 356 WEST 58TH STREET, NEW YORK, NY 10019